

THE CLAIMS

1. (Currently Amended) A method of monitoring an amount of refrigerant in a refrigerant system that has an expansion device, comprising:

determining an operating position of the expansion device;

the expansion device having a plurality of operating positions including a fully open position and the method includes determining when the expansion device is in the fully open position;

determining when at least one other system characteristic indicates that the expansion device is in the fully open position for a reason other than the amount of refrigerant being below the desired amount; and

monitoring at least one of an indoor temperature, an outdoor temperature, a system low side pressure, or a system high side pressure to determine if the expansion device is in the fully open position for a reason other than the amount of refrigerant being below the desired amount.

2.-5. (Cancelled)

6. (Original) The method of claim 1, including associating a switch with the expansion device such that the switch provides an indication of when the expansion device is in the fully open position.

7. (Currently Amended) A refrigerant system, comprising:

a compressor;

a condenser in fluid communication with at least the compressor;

an evaporator in fluid communication with at least the condenser;
an expansion device between the condenser and the evaporator, the expansion device having a fully open position where the expansion device allows a maximum flow between the condenser and the evaporator; and

a controller that determines if an amount of refrigerant in the system is below a desired amount responsive to the expansion device being in the fully open position;

the controller monitors when at least one other system characteristic indicates that the expansion device is in the fully open position for a reason other than the amount of refrigerant being below the desired amount; and

the controller determines at least one of an indoor temperature, an outdoor temperature, a system low side pressure or a system high side pressure to determine if the expansion device is in the fully open position for a reason other than the amount of refrigerant being below the desired amount.

8. (Original) The system of claim 7, wherein the expansion device provides an indication of when the expansion device is in the fully open position to the controller.

9. (Original) The system of claim 8, including a switch associated with the expansion device, the switch being activated to provide a signal to the controller when the expansion device is in the fully open position.

10. (Original) The system of claim 9, wherein the switch is positioned within the expansion device and the expansion device includes a plunger member that activates the switch when the plunger member moves into the fully open position.

11. (Original) The system of claim 7, wherein the controller automatically shuts down at least a portion of the system responsive to determining that the amount of refrigerant is below a desired amount.

12. (Currently Amended) The system of claim 7, wherein the controller provides an indication that the refrigerant amount is below the desired amount, when said controller has determined that said at least one other system characteristic does not indicate that the expansion device is in the fully open position for a reason other than the amount of refrigerant being below the desired amount.

13.-18. (Cancelled)

19. (New) The method as set forth in claim 1, wherein said refrigerant system includes a compressor, and said compressor being at least partially shut down in response to a determination that the amount of refrigerant is below a desired amount.

20. (New) The method of claim 1, further including the step of determining the amount of refrigerant is below a desired amount responsive to determining that the expansion device is in the fully open position and determining that the expansion device is not the fully open position for a reason other than the amount of refrigerant being below the desired amount.

21. (New) A method of monitoring an amount of refrigerant in a refrigerant system that has an expansion device, comprising:

determining an operating position of the expansion device;

the expansion device having a plurality of operating positions including a fully open position and the method includes determining when the expansion device is in the fully open position;

determining when at least one other system characteristic indicates that the expansion device is in the fully open position for a reason other than the amount of refrigerant being below the desired amount;

determining the amount of refrigerant is below a desired amount responsive to determining that the expansion device is in the fully open position and determining that the expansion device is not the fully open position for a reason other than the amount of refrigerant being below the desired amount; and

the refrigerant system incorporating a compressor, and the method further including the step of at least partially shutting down said compressor when a determination is made that the amount of refrigerant in the system is below the desired amount.

22. (New) The method as set forth in claim 21, wherein said compressor is entirely shut down .

23. (New) A refrigerant system, comprising:

a compressor;

a condenser in fluid communication with at least the compressor;

an evaporator in fluid communication with at least the condenser;

an expansion device between the condenser and the evaporator, the expansion device having a fully open position where the expansion device allows a maximum flow between the condenser and the evaporator;

a controller that determines if an amount of refrigerant in the system is below a desired amount responsive to the expansion device being in the fully open position;

the controller determines when at least one other system characteristic indicates that the expansion device is in the fully open position for a reason other than the amount of refrigerant being below the desired amount; and

the controller at least partially shutting down said compressor when a determination is made that the amount of refrigerant in the system is below the desired amount and the at least one other system characteristic does not indicate a reason other than the amount of refrigerant being below the desired amount.

24. (New) The system as set forth in claim 23, wherein said compressor is entirely shut down.